PET/MRI and PET/CT in follow-up of head and neck cancer patients

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Purpose: Positron Emission Tomography (PET)/Magnetic Ressonance Imaging (MRI) is the emerging hybrid imaging modality. The aim of this study was to assess contrast enhanced (ce) PET/MRI compared to cePET/Computed Tomography (CT) in patients with suspected recurrence of HNC.

Methods and Materials: Eighty-seven patients were enrolled in this prospective study. All patients underwent PET/CT-MRI in a tri-modality setup. Diagnostic accuracy concerning detection of recurrent HNC was evaluated for cePET/CT and cePET/MRI, as well as image quality, presence of unclear FDG uptake and diagnostic advantages of use of gadolinium.

Results: CePET/MRI showed no statistically significant difference in diagnostic accuracy compared to cePET/CT (91,5% vs 90,6%). Artefacts grade was similar in both methods, while their location was different. CePET/CT artefacts were primarily located in the supra-hyoid area, while cePET/MRI, artefacts were more equally distributed among the supra and infra-hyoid neck regions. Both methods showed 34 unclear FDG uptake, of those eleven could be solved by cePET/MRI and five by cePET-CT. The use of gadolinium in PET/MRI didn't yield higher diagnostic accuracy, but helped to define tumour margins in 6,9% of patients.

Conclusion: CePET/MRI might be slightly superior compared to cePET/CT to solve unclear FDG uptake related to possible tumour recurrence in patients with follow-up after HNC. It might also be the imaging tool of choice for evaluation of the oropharynx and the oral cavity based on a higher incidence of technical artefacts in cePET/CT in this area. However, overall there is no statistically significant difference concerning diagnostic accuracy of the two methods.